

What is claimed is:

1. A system including a plurality of types of modular structural components for construction of structures, each structural component including at least one of a plurality of structural elements, the structural elements comprising:

chords, each chord including

a generally elongated main body having generally square cross section defined by four main walls surrounding a central bore and having four interior main surfaces and four exterior main surfaces, and

a T-slot structure extending along and centered on each exterior main surface, each T-slot structure having an interior T-slot adapted to accept a bolt type fastener, each T-slot including a shaft slot extending inwards from an outer surface of the T-slot structure and connecting with a cross slot extending at a right angle to the shaft slot at an inner end of shaft slot, and

forming strips, each forming strip including

a single generally elongated strip plate formed into a plurality of strip segments, each strip segment being oriented at a right angle with respect to an adjacent strip segment and the strip segments being formed into regions including, in succession,

a corner region forming a w-shaped cross section forming bearing surfaces mating with corresponding chord bearing surfaces formed by two adjacent main walls and an adjacent side wall of T-slot structure,

a face region forming a bearing surface mating with chord bearing surfaces formed by outer face surfaces of the T-slot structure, and

an attachment region extending outwards from an edge of the face region for stiffening of the forming strip.

2. The structural elements of the modular structural components of claim 1, wherein the structural components include at least one of:

straight chords, wherein a straight chord is a generally vertically oriented single chord having a plurality of bolt holes extending through the chord near the ends of the chord to allow attachment of the straight chord to another structural component,

purlins, wherein a purlin is a generally horizontally oriented structural component including parallel structural elements interconnected by reinforcing elements and with a connection element located at each end of the purlin for attachment of the purlin to another structural component,

trusses, wherein a truss is a generally horizontally oriented structural reinforcement component including parallel structural elements interconnected by reinforcing elements and with a connection element located at each end of the truss for attachment of the truss to another structural component,

braces, wherein a brace is a structural reinforcement component that is generally oriented at an angle to the horizontal and that includes parallel structural elements interconnected by reinforcing elements and with a connection element located at each end of the brace for attachment of the brace to another structural component,

brackets, wherein a bracket is a reinforcing element for attachment at an angle between two structural components and having a connection element at each end of the reinforcement element for attachment of the bracket to another structural component, and

roofing components, wherein a roofing component is a structural component comprised of structural elements arranged to form standard sections of roof structures and having at least one connection element for attachment of the roofing component to another structural component.

3. The structural elements of the modular structural components of claim 2, wherein an attachment element is a segment of forming strip permanently attached to a structural component to mate with a chord of another structural component and having at least one bolt hole located for attachment of the segment of forming strip to the other structural component.

4. The structural elements of the modular structural components of claim 1, wherein the structural components further include:

stubs, wherein a stub is a segment of a square cross section tubing dimensioned to slidably fit within the bore of a chord and having at least one

transverse bolt hole for receiving a bolt type fastener for connecting the stub into the bore of the chord.

5. The structural elements of the modular structural components of claim 1, wherein a forming strip further includes at least one bolt hole accepting a bolt type fastener for attachment of the forming strip to a chord by means of at least one of a T-bolt mating with a T-slot structure of the chord and a hex-bolt mating with a bolt hole extending transversely through the chord wherein the at least one bolt hole extends through the shaft slots and cross slots of opposing T-slot structures of the chord.

6. The structural elements of the modular structural components of claim 2, wherein at least selected ones of the structural components include bolt holes located near the ends of a structural element of a selected structural component and bolt holes spaced along the selected structural component for the attachment of other structural components to the selected structural component.

7. The structural elements of the modular structural components of claim 1, wherein:

each T-slot structure is defined by two parallel slot side walls extending outwardly in parallel from an exterior main surface of a chord and by two slot face walls extending inwardly from the outer edges of the slot side walls and parallel to the exterior main surface.

8. The structural elements of the modular structural components of claim 2, wherein each structural component includes at least one bolt hole for receiving a bolt-type connector for connecting one structural component to another structural component.

9. The structural elements of the modular structural components of claim 1, wherein:

the bolt-type connectors include at least one of standard hex-bolts and T-bolts, and wherein

a T-bolt has a rectangular head portion longer than the width of a cross slot and narrower than a width of a shaft slot, so that

the head portion of a T-bolt can pass through the shaft slot and into the cross slot of a T-slot when the head portion of the T-bolt is aligned with a longitudinal axis of the T-slot and will be retained in the cross slot when the head portion is rotated to an orientation transverse to the longitudinal axis of the T-slot.

10. The structural elements of the modular structural components of claim 9, wherein:

at least one inner surface of each T-slot is a bearing surface to support compressive forces resulting from tensional and torsional forces imposed through a T-bolt and wherein each plane defined by an innermost face of each cross slot is offset inwardly with respect to a corresponding exterior main wall surface of the chord, thereby forming an increased and diagonal main wall thickness between planes defined by the interior surfaces of each cross slot and a corresponding exterior main surface of the chord.

11. The structural elements of the modular structural components of claim 1, wherein:

the bearing surfaces of a chord and of a forming strip form a mutually mating configuration such that up to four forming strips may be mated to a given location along a chord with each forming strip mating to a corresponding one of the four exterior main surfaces of the chord.

12. In a system including modular structural components for construction of structures, a connection structure for structurally attaching a first structural component to a second structural component, comprising:

a segment of chord forming a permanent integral element of one of the first and second structural components,

a chord including

a generally elongated main body having generally square cross section defined by four main walls surrounding a central bore and having four interior main surfaces and four exterior main surfaces, and

a T-slot structure extending along and centered on each exterior main surface, each T-slot structure having an interior T-slot adapted to accept a bolt type fastener, each T-slot including a shaft slot extending inwards from an

outer surface of the T-slot structure and connecting with a cross slot extending at a right angle to the shaft slot at an inner end of shaft slot, and

a segment of forming strip forming a permanent integral element of another of the first and second structural components,

a forming strip including

a single generally elongated strip plate formed into a plurality of strip segments, each strip segment being oriented at a right angle with respect to an adjacent strip segment and the strip segments being formed into regions including, in succession,

a corner region forming a w-shaped cross section forming bearing surfaces mating with corresponding chord bearing surfaces formed by two adjacent main walls and an adjacent side wall of T-slot structure,

a face region forming a bearing surface mating with chord bearing surfaces formed by outer face surfaces of the T-slot structure, and

an attachment region extending outwards from an edge of the face region for stiffening of the forming strip, and

at least one bolt hole located in the face region of the forming strip and accepting a bolt type fastener for attachment of the forming strip to the chord by means of at least one of a T-bolt mating with a T-slot structure of the chord and of a hex-bolt mating with a bolt hole extending transversely through the chord wherein the at least one bolt hole extends through the shaft slots and cross slots of opposing T-slot structures of the chord.

13. The connection structure of claim 12, wherein:

each T-slot structure is defined by two parallel slot side walls extending outwardly in parallel from an exterior main surface of a chord and by two slot face walls extending inwardly from the outer edges of the slot side walls and parallel to the exterior main surface.

14. The connection structure of claim 12, wherein:

the bearing surfaces of a chord and of a forming strip form a mutually mating configuration such that up to four forming strips may be mated to a given

location along a chord with each forming strip mating to a corresponding one of the four exterior main surfaces of the chord.

15. In a system including a plurality of types of modular structural components for construction of structures, each structural component including at least one of a plurality of structural elements, a curbing component to prevent the entry and escape of flowable materials into and out of the structure along a ground surface, the curbing comprising:

- a sealing barrier positionable along the ground surface and parallel to a wall of the structure and forming a sealed barrier with the ground surface to prevent the passage of the flowable materials along the ground surface and beneath the sealing barrier, including

- a rigid barrier forming a barrier against the passage of the flowable material, and

- a sealer mounted on a lower surface of the rigid barrier and forming a seal between the rigid barrier and the ground surface to prevent the passage of flowable material under the rigid barrier,

- a curbing bracket for adjustably mounting the sealing barrier to a lower portion of the wall, including

- an adjustable bracket for support and vertical positioning of the sealing barrier with respect to the ground surface, including

- an adjustable support having a barrier bracket on a lower end thereof for attachment of the rigid barrier thereto, and

- an adjustable mounting for receiving an upper end of the adjustable support and adjustably determining a downward extension of the adjustable support from the adjustable mounting, and

- a mounting bracket extending downwards and outwards from the wall for mounting the adjustable bracket to the lower part of the wall, including

- a main support extending downwards and outwards from the wall,

- a mounting connector for mounting the main support to a structural element of the wall, and

a mounting plate extending downwards from the main support and having a quick release connection for supporting the adjustable mounting in either of two selectable vertical positions with respect to the mounting plate.

16. The curbing component of claim 15, wherein:

the mounting connector of the mounting bracket is a forming strip mating with a chord forming the structural element of the wall,

the mounting plate of the mounting bracket is a forming strip, and

the adjustable support and adjustable mounting of the adjustable bracket are a segment of chord mating with the mounting bracket forming strip and adjustably connected thereto by a T-bolt.

17. The system of claim 1, further including a curbing component, comprising:

a sealing barrier positionable along a ground surface and parallel to a wall of the structure and forming a sealed barrier with the ground surface to prevent passage of the flowable materials along the ground surface and beneath the sealing barrier, including

a rigid barrier forming a barrier against the passage of the flowable material, and

a sealer mounted on a lower surface of the rigid barrier and forming a seal between the rigid barrier and the ground surface to prevent the passage of flowable material under the rigid barrier,

a curbing bracket for adjustably mounting the sealing barrier to a lower portion of the wall, including

an adjustable bracket for support and vertical positioning of the sealing barrier with respect to the ground surface, including

an adjustable support having a barrier bracket on a lower end thereof for attachment of the rigid barrier thereto, and

an adjustable mounting for receiving an upper end of the adjustable support and adjustably determining a downward extension of the adjustable support from the adjustable mounting, and

a mounting bracket extending downwards and outwards from the wall for mounting the adjustable bracket to the lower part of the wall, including

a main support extending downwards and outwards from the wall,

a mounting connector for mounting the main support to a structural element of the wall, and

a mounting plate extending downwards from the main support and having a quick release connection for supporting the adjustable mounting in either of two selectable vertical positions with respect to the mounting plate.

18. The curbing component of claim 17, wherein:

the mounting connector of the mounting bracket is a forming strip mating with a chord forming the structural element of the wall,

the mounting plate of the mounting bracket is a forming strip, and

the adjustable support and adjustable mounting of the adjustable bracket are a segment of chord mating with the mounting bracket forming strip and adjustably connected thereto by a T-bolt.

19. A method for constructing a modular structure from a plurality of types of modular structural components, comprising the steps of:

mating a forming strip segment forming a permanent integral element a first structural component with a chord segment forming a permanent integral element of a second structural component,

inserting a bolt type fastener into at least one bolt hole located in a face region of the forming strip segment of the first structural component and accepting the bolt type fastener into engagement with the chord segment of the second structural component wherein the bolt type fastener is one of a T-bolt mating with a T-slot structure of the chord segment and a hex-bolt mating with a bolt hole extending transversely through the chord segment, and

adjusting the bolt type fastener to bring the forming strip segment into an engaging relationship with the chord segment, wherein

the chord segment includes,



a generally elongated main body having generally square cross section defined by four main walls surrounding a central bore and having four interior main surfaces and four exterior main surfaces, and

a T-slot structure extending along and centered on each exterior main surface, each T-slot structure having an interior T-slot adapted to accept a bolt type fastener, each T-slot including a shaft slot extending inwards from an outer surface of the T-slot structure and connecting with a cross slot extending at a right angle to the shaft slot at an inner end of shaft slot, and

the forming strip segment includes,

a single generally elongated strip plate formed into a plurality of strip segments, each strip segment being oriented at a right angle with respect to an adjacent strip segment and the strip segments being formed into regions including, in succession,

a corner region forming a w-shaped cross section forming bearing surfaces mating with corresponding chord bearing surfaces formed by two adjacent main walls and an adjacent side wall of T-slot structure,

a face region forming a bearing surface mating with chord bearing surfaces formed by outer face surfaces of the T-slot structure, and

an attachment region extending outwards from an edge of the face region for stiffening of the forming strip, and

at least one bolt hole located in the face region of the forming strip.

20. The connection structure of claim 19, wherein:

each T-slot structure is defined by two parallel slot side walls extending outwardly in parallel from an exterior main surface of a chord segment and by two slot face walls extending inwardly from the outer edges of the slot side walls and parallel to the exterior main surface.

21. The connection structure of claim 19, wherein:

the bearing surfaces of a chord segment and of a forming strip segment form a mutually mating configuration such that up to four forming strip segments may be mated to a given location along a chord segment with each forming strip

segment mating to a corresponding one of the four exterior main surfaces of the chord segment.

22. A method for attaching a first modular structural component to a second modular structural component in constructing a modular structure, comprising the steps of:

mating a forming strip segment forming a permanent integral element of one of the first and second structural components with a chord segment forming a permanent integral element of an other of the first and second structural components,

inserting a bolt type fastener into at least one bolt hole located in a face region of the forming strip segment and accepting the bolt type fastener into engagement with the chord segment wherein the bolt type fastener is one of a T-bolt mating with a T-slot structure of the chord segment and a hex-bolt mating with a bolt hole extending transversely through the chord segment, and

adjusting the bolt type fastener to bring the forming strip segment into an engaging relationship with the chord segment, wherein

the chord segment includes,

a generally elongated main body having generally square cross section defined by four main walls surrounding a central bore and having four interior main surfaces and four exterior main surfaces, and

a T-slot structure extending along and centered on each exterior main surface, each T-slot structure having an interior T-slot adapted to accept a bolt type fastener, each T-slot including a shaft slot extending inwards from an outer surface of the T-slot structure and connecting with a cross slot extending at a right angle to the shaft slot at an inner end of shaft slot, and

the forming strip segment includes,

a single generally elongated strip plate formed into a plurality of strip segments, each strip segment being oriented at a right angle with respect to an adjacent strip segment and the strip segments being formed into regions including, in succession,

a corner region forming a w-shaped cross section forming bearing surfaces mating with corresponding chord bearing surfaces formed by two adjacent main walls and an adjacent side wall of T-slot structure,

a face region forming a bearing surface mating with chord bearing surfaces formed by outer face surfaces of the T-slot structure, and

an attachment region extending outwards from an edge of the face region for stiffening of the forming strip, and

at least one bolt hole located in the face region of the forming strip.

23. The connection structure of claim 22, wherein:

each T-slot structure is defined by two parallel slot side walls extending outwardly in parallel from an exterior main surface of a chord segment and by two slot face walls extending inwardly from the outer edges of the slot side walls and parallel to the exterior main surface.

24. The connection structure of claim 22, wherein:

the bearing surfaces of a chord segment and of a forming strip segment form a mutually mating configuration such that up to four forming strip segments may be mated to a given location along a chord with each forming strip segment mating to a corresponding one of the four exterior main surfaces of the chord segment.